

Land & Water

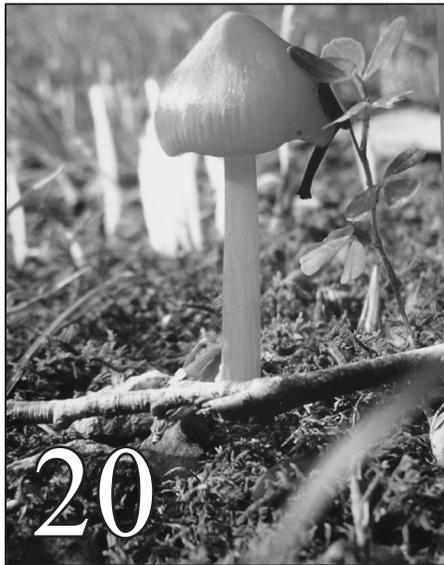


Kentucky Energy and Environment Cabinet

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Land Air & Water

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Our cover

*Our cover photo was taken by
Chris Oelschlager of Madison-
ville, Kentucky.*



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Land Air & Water

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Keeping a watchful eye on air quality

By Roberta Burnes
The Division for Air Quality

There was a time when the air was thick with pollutants you could see, smell and even taste. When air pollution was collected in buckets and measured in inches.

For Kentucky, those days are long past. Air quality today is dramatically – and measurably – cleaner than it was 50, 20 or even 10 years ago.

So, how do we know our air is cleaner today?

At the heart of the Division for Air Quality's mission to protect clean air for Kentucky is an electronic army of air monitors spread across the Commonwealth. These sophisticated machines (and their human handlers) collect and analyze thousands of air samples each day.

Tasting and vacuuming the air

At its simplest, an air monitor measures air pollution in the ambient or outdoor air. The Clean Air Act requires monitoring for six criteria pollutants – ozone, particulate matter, nitrogen dioxide, sulfur dioxide, carbon monoxide and lead – as well as volatile organic compounds (VOCs), which contribute to ozone pollution.

Monitors use different methods for different pollutants. Some monitors use chemistry to “taste” the air, while others use a vacuum to pull the air through a filter, which is later weighed. Still others collect air in canisters to be analyzed in a lab.

Some monitors collect data continuously, while others collect samples on an hourly or daily basis. With a network of 119 monitors across the Commonwealth, that adds up to a lot of data. A single month might see as many as 195,000 unique measurements across the entire network.

Weather is an important piece of the puzzle, too. Pollutants can be carried by wind and influenced by temperature. Weather instruments at several monitoring sites track wind speed and direction, ambient air temperature and humidity.

Minding the monitors

For more than 18 years, Environmental Inspector Joe Boggs has tended to the air monitors in eastern Kentucky's Ashland region. Boggs's official job title doesn't begin to tell the story of all that he does. Data checker, sample collector, instrument trouble-shooter and groundskeeper, Boggs does it all in his day to day work as an air monitoring specialist. Boggs's job is hands-on, and that's what he loves about it.

“It's never the same thing twice,” Boggs said. “I love working with the instruments, solving problems and keeping everything running smoothly.”

Being outdoors is another plus. One of Boggs's monitoring sites happens to be nestled in a scenic area near Grayson Lake in Carter County. The remoteness of this site means air quality measurements here can be used as a baseline for normal, background conditions of pollutant levels. “It's not unusual for a bald eagle, fox or bobcat to pass by while I'm working on the monitors here,” he said. One of Boggs's jobs is to collect and restock filters for the PM_{2.5} sampler. PM_{2.5} is shorthand for fine particulate matter that measures



less than 2.5 microns in diameter. Because it is so tiny, PM_{2.5} can be inhaled deep into lungs and lead to serious health problems.

While many air monitors send data electronically to computers at regional air quality offices, the PM_{2.5} sampler requires regular visits by a field inspector like Boggs to change filters, clean and calibrate the instrument.

This sensitive instrument works by pulling a measured volume of air through a pre-weighed filter for a period of 24 hours. Before reaching the filter, the air passes through a chamber where larger particles fall out of the air stream. Particles less than 2.5 microns pass onto the filter, where they are collected.

Once the sample has been taken, the instrument stores the filter in a canister until Boggs retrieves it. “As soon as I collect the filters, I bag and label each one with the date and time of sampling. Then we ship them to a laboratory for weighing again,” Boggs said. Keeping the filters cool en route is essential, since some particulate matter is composed of liquid droplets that may evaporate in warmer temperatures.

By subtracting the starting weight of the filter from its ending weight after sampling, it is possible to determine exactly how much PM_{2.5} was collected.

A network of monitors

Most of Kentucky’s ambient air monitoring sites are nowhere near as scenic and remote as Grayson Lake. Urban sites are far more typical.

Kentucky’s air monitoring network includes 34 monitoring stations in 26 counties; this includes monitors operated by the Louisville Metro Air Pollution Control District and by the National Park Service at Mammoth Cave.

Federal regulations outline specific requirements for siting air monitoring stations (40 CFR Part 58). In general, air monitors are placed in densely populated areas or near major sources of pollution, whether it’s a busy highway or a stationary source with a smokestack.

Each year, Division staff review the site locations of each air monitoring station to ensure that adequate coverage is being provided and regulatory requirements are met. Environmental scientist Jennifer Miller coordinates these efforts with the Ambient Air Monitoring Network Plan.

“We’re very strategic in where we place these air monitoring stations,” Miller said. “Knowing the locations of major pollution sources and population centers helps us pinpoint the best locations for monitoring. Adding wind and weather data to the mix, we can use air dispersion modeling as a tool to characterize air quality in counties without air monitors.”

Ultimately, it all comes down to the data, and that data tells a remarkable story of air quality improvement in the Commonwealth over the last several decades. Monitored pollution levels in Kentucky have dropped significantly since the Clean Air Act was adopted in 1970, even as population and energy consumption have increased.

For example, sulfur dioxide and nitrogen oxide emissions from Kentucky coal-fired power plants have decreased more than 75 percent in the past 25 years, thanks to better pollution controls and recent power plant retirements.

At the same time, air pollutant standards are much tighter today than they were decades ago. “If today’s ozone standards had been in effect in 1970, virtually every monitor in Kentucky would have registered violations with those standards,” said Miller. “In contrast, all but one of our ozone monitors is currently showing compliance.” A single monitor in Boone County is not meeting the recently-strengthened ozone standard.

“Without our air monitoring network, we would still be guessing about air quality,” said Miller. 



LEFT OPPOSITE PAGE: Environmental Scientist Joe Boggs sets off to prepare samples. ABOVE TOP RIGHT: A sampler captures air for later testing. ABOVE: Environmental Scientist Ashley Bedel weighs a PM_{2.5} filter in the Division’s climate-controlled laboratory to determine the concentration collected. Photos by Roberta Burnes.

School energy managers: *the sustaining power of energy efficiency*

By Eileen Hardy
Department for Energy Development and Independence

Armed with perseverance, insight and knowledge, school energy managers across Kentucky are teaching a valuable lesson: savings garnered from energy efficiency mean more money for student learning.

Energy conservation is trending. From individuals to businesses and schools, it's apparent that we must be smart with our energy consumption. Our environment and economy depend upon it. With as much as 30 percent of a school building's total energy use going to waste, Kentucky's schools are seeking ways to become energy efficient.

Some schools are empowering their student body, faculty and staff to become energy advocates. Others, where funding is available, have hired an energy manager to track and evaluate utility bills, assess buildings and identify opportunities to improve efficiency. As a result, schools once known as energy drains are embracing energy efficiency in increasing numbers. The numbers bear this out.

Energy use in Kentucky's 173 school districts is down 11 percent in the past five years. Statewide, this reduction has been accomplished despite school facilities growing by more than 6 million square feet, and the cost per kilowatt hour of electricity increased 16 percent. Kentucky has experienced a surge in the number of ENERGY STAR certified schools, and with a total of 329, currently ranks third in the nation in percentage.

ENERGY STAR is a voluntary program of the U.S. Environmental Protection Agency that provides a fair assessment of the energy performance of a property relative to its peers. Energy data is verified by a professional engineer or registered architect over a twelve month period, and scored on a 1-100 scale. Schools earning a score of 75 or higher earn the ENERGY STAR label.

A decade ago, energy management

positions were not common in schools and energy costs were considered a fixed operating cost, over which school officials had little control. But rising energy prices, coupled with a challenging economic environment and an increasing focus on environmental concerns, has grabbed the attention of many school leaders. With the help of energy managers, they've learned energy is a controllable cost and, when used efficiently, is a resource to support teaching positions and to educate students.

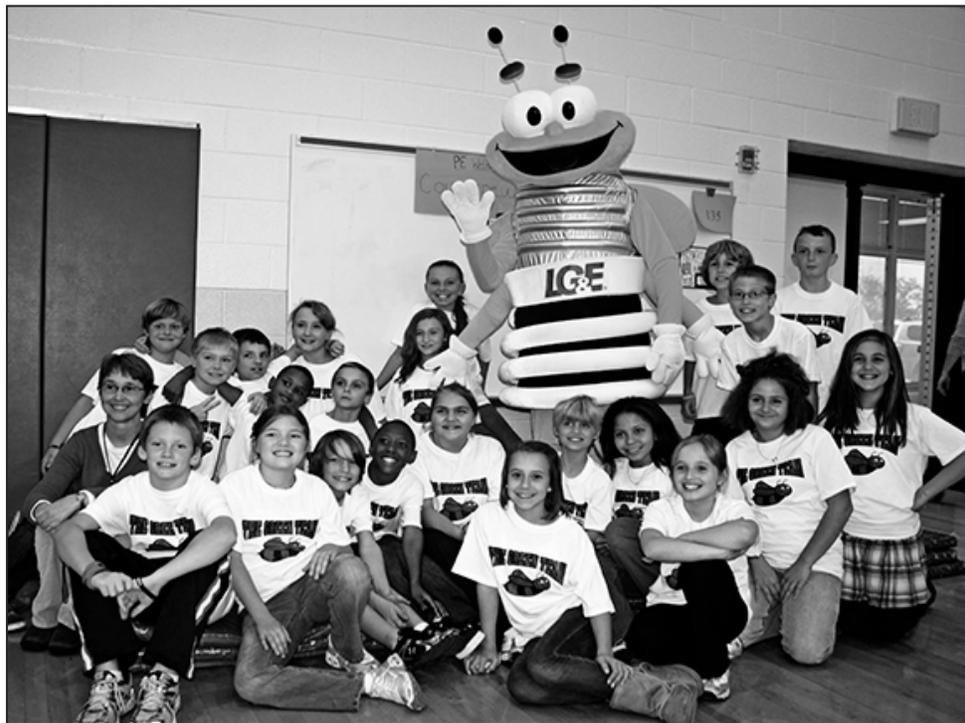
"We need to be responsible stewards of our community's dollars. Our community needs to know that for every dollar we save, money is put into the classroom, and into the seats of every student," said Shelby County Superintendent James Neihof. "That's why we do what we do, it's for the kids. The learning environment is our highest priority. Our board of education made a commitment early on to support energy management, and our local

energy suppliers have really worked well with us through several grant opportunities and rebates."

Six years ago, the Energy and Environment Cabinet partnered with the Kentucky School Boards Association (KSBA) to develop the School Energy Managers Project (SEMP), as a means to improve energy efficiency in schools. This state-wide program created an energy infrastructure for all 173 school districts and facilitated placing energy managers in school districts.

Today, there are 51 skilled energy managers providing services to more than half of school districts in Kentucky. From when the program began in 2010 to the end of the 2015 school year, it has seen cost savings of more than \$68 million. And savings are projected to increase

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Students from an Energy Star school pose with LG&E's mascot

Feeding the hungry and curbing food waste

By Mary Jo Harrod
Division of Compliance Assistance

John Walker, an environmental scientist for the Division for Air Quality, had heard that 40 percent of all food grown in this country never reaches the plate. He already knew the staggering statistic that one in six Kentuckians does not have enough to eat or the ability to access food that is fresh and nutritious.

"I grew up in a small mining village in northern Wales. I was raised by my grandmother, and though we were poor, we never went hungry. To me, hunger was something that happened to people in faraway countries," said Walker. "After moving to Kentucky and being involved in local food movements, I realized that hunger was on my doorstep, and that it was up to each of us to do whatever we could to alleviate hunger and help our fellow neighbors in need."

So, Walker and two friends in the Lexington area, all with gardens producing more bounty than they could use, decided in 2010 to tackle the problems of hunger and food waste.

More than six years later, through the help of Walker and his friends, GleanKY, part of KY EXCEL through the Kentucky Energy and Environment Cabinet (EEC), is providing fresh produce to thousands of people in central Kentucky, partnering with the Lexington Farmers' Market, Good Foods Coop, Reed Valley Orchard and using volunteers to gather excess produce from farms, orchards, farmers' markets, grocery stores and supermarkets.

Volunteers pick up produce that can't be sold but is otherwise perfectly edible and deliver it to more than 60 hunger programs throughout Fayette County and nearly 20 more in Scott, Franklin and Madison counties.

"I had read many articles about gleaning out west, but no one was doing it in Lexington," said Walker. "People should not go hungry. When I saw so much food being simply thrown away, from farm to store, it was morally imperative for me to



ABOVE: A GleanKY truck sits with its goods. **RIGHT:** John Walker, one of the founders of GleanKY. Photos courtesy of GleanKY

try and do something about it."

Initially, the group targeted churches for volunteers and recipients and other agencies that fed the hungry, such as the Catholic Action Center, Nathaniel Mission, Lighthouse Mission and Lexington Rescue Mission.

Stephanie Wooten, executive director of the organization, explained, "GleanKY is neither a food producer nor a food preparer, but it's a system to link them and solve two issues at once."

Walker said the organization has a unique model. "We don't go through a food bank, except when we have too much, and then we will pass it on to God's Pantry," he said.

GleanKY has two requirements for any agencies receiving produce through the program. The produce cannot be sold since it is donated for the use of hunger programs. And the agencies who use it must serve families or individuals who experience food insecurity.

According to Wooten, 96 percent of GleanKY's partner programs reported an increase in the nutritional value of the meals they provide after partnering with GleanKY and 76 percent of their partner programs reported being able to serve more people after partnering with GleanKY. "It's something we are pretty proud of," said Wooten.

In 2015, GleanKY achieved impressive results with 216,513 pounds of food being processed, 2,404 volunteer hours donated, 618 food trips made, 60 agencies served



and 38 sources of excess produce.

According to the organization, it took in \$147,511 in grants and donations and used all but \$15,015 in administration costs on the hungry and undernourished. The organization said it was on target to collect and distribute one million pounds of fresh fruits and vegetables in 2016.

"We set out to do a good thing in the Commonwealth, and I think we are setting a great example for others in Kentucky to follow," said Walker, who is vice-president of GleanKY and also a board member. "I think very highly of it, especially since it has managed to achieve so much in so short a time. This is due in no small part to our board, staff, interns, volunteers and the farmers and stores that have been so generous."

One GleanKY recipient said service is a blessing for people who don't have enough money to buy things to eat. "It's a wonderful idea if they can keep helping people who really need the food," she said.

If you would like to get involved with GleanKY, go to www.gleanky.org and follow the volunteer link. 

Nurturing nature back to life

By Jennifer Turner
Division of Forestry

Barry Michaels of Danville had long dreamed of having his own piece of the Bluegrass, a place where he and his two boys could hunt and fish. So in 2004, he bought 260 acres in Lincoln County.

There was one problem, however. On his new farm there was nothing to hunt.

With plenty of trees for food and shelter, Michaels thought that there should be plenty of game on his property, but there were no deer, turkey, squirrels and virtually no song birds either.

“Prior to the purchase, I walked a circle of about 1 ½ miles in 1 inch of snow and came across a total of one deer track. I knew then we had our work cut out for us”, said Michaels. “I knew I needed help.”

Two weeks after he bought his new place, Michaels called his local extension office for help. They gave him the Kentucky Division of Forestry’s (KDF) phone number and KDF Forester Glen Datillo met with Michaels and walked the property with him.

Datillo told him that the property had been over hunted and the choicest trees had been high grade harvested sometime in the early 1990s. Datillo said that the over hunting partially explained the lack of wildlife; the other reason was that the remaining trees on the property didn’t provide a suitable habitat for wildlife. They were of low quality and needed to be removed to manage for any good crop trees that were available for wildlife and timber.

Datillo suggested that Michaels apply for the Kentucky Forest Stewardship Program (KFSP), which is a free program available to all private forestland owners. The program is designed to help landowners prepare a customized forest stewardship plan based on their goals and objectives for the property. The plan consists of a description of tree species, soil quality, watershed resources, recreation, any rare, threatened and endangered species and wetland and archeological/historic values on the property. This data provides the recommendations for the Forest Stewardship Plan. Maps of the landowner’s property are also provided as well as soil maps of the property.

As per the primary goals that Michaels wanted to achieve with his forestland, Datillo recommended a Timber Stand Improvement (TSI) cut for the forestland areas as needed and the open/field areas to convert to wildlife friendly vegetation along with watering holes and wildlife thickets around the edges of the fields.

A TSI is used to enhance the growth rates of timber and shorten the time required for hardwood crops to mature. Michaels chose the TSI method called crop tree release, which is the practice of deadening selected trees in younger, overstocked



ABOVE: *Trees on Michaels’s farm are marked for removal.* Photo courtesy of the Kentucky Division of Forestry.

forests for the benefit of releasing desirable crop trees. It takes decades to grow quality hardwood trees such as white and red oaks, cherry, ash, yellow poplar, hickory and black walnut. Datillo marked 10 acres of trees to be deadened and Michaels either cut the trees down or cut through the trees cambium layer, also called girdling. Then Michaels used an herbicide and left the dying trees in place to later become a wildlife habitat. During the first two years of implementing his stewardship plan, Michaels saw deer on four separate occasions, but still no turkey.

Since then, Michaels has released desirable tree species on 156 acres of his property. In 15-20 years, Michaels will be able to do a selective harvest of the first released acres. At that time, Michaels will be able to select the mature, commercial trees of a specific diameter and harvest them on a rotational cycle to maintain his forest’s natural balance. This also will ensure that Michaels will have a continuous supply of timber for sale in the future and his wildlife will have a continuous supply of food and shelter.

“Most of the TSI improvements will be noticed over the long-term versus the short-term effects. My expectation is that the marketable timber we are protecting will grow faster now that the unwanted timber has been removed. Also, as more sunlight is able to reach the forest floor, we are seeing more “new generation” growth that should help support wildlife,” said Michaels.

Further following his Forest Stewardship Plan recommendations, Michaels has also installed 6 acres of food plots. These food plots will benefit many species of native wildlife including turkey, mourning doves, bobwhite quail and

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Millions of dollars available to create jobs in Appalachian counties

By John Mura
Office of the Secretary

Across the Commonwealth, creative citizens are busy thinking of ways that Kentucky's abandoned mine lands in Appalachia can be turned into places that will attract full-time, sustainable jobs to the region. This follows the state receiving up to \$30 million in federal grant money that has been set aside to give to projects proposed for abandoned mine lands in 54 Appalachian counties that will foster jobs to replace those lost in the downturn of the coal mining industry.

"If used wisely, these funds will improve lives and strengthen the economy in the region for generations to come," said Gov. Matt Bevin. "The potential of this program is enormous, and we must make the best use of these one-time funds."

U.S. Rep. Harold "Hal" Rogers (KY-05), Chairman of the U.S. House Appropriations Committee, worked to secure the funding through the FY 2016 Omnibus appropriations bill. He said the money will go a long way towards helping Kentucky's struggling coal communities as they strive to rebound from the devastating loss of more than 10,000 coal mining jobs over the last eight years.

"The pilot will allow our coal communities to reclaim abandoned mine sites while simultaneously pursuing proactive economic development opportunities to help put our people back to work and spur innovation in Eastern Kentucky," Rep. Rogers said.

The Kentucky Division of Abandoned Mine Lands has been accepting applications for use of the grant money. Projects that are chosen for submission for federal approval must demonstrate economic and community development as well as mine land reclamation and must be measurable in terms of jobs and businesses created, infrastructure created or restored, and individuals, households or communities served.

To be considered, any proposal must address the issue of mitigating abandoned mine lands in the Appalachian counties of Kentucky as recognized by the Appalachian Regional Commission. After that, emphasis will be placed on proposals that have the potential to create long-term economic development or community development benefits.

"We are encouraging community leaders throughout the region to look at options that will have the best chances of bringing dramatic growth and jobs to Appalachia," said Erik Dunnigan, acting secretary of the Cabinet for Economic Development. "For example, several communities may choose to band together to upgrade industrial sites, including providing the necessary infrastructure and possibly spec buildings, so that companies looking to expand in Kentucky can be up and running quickly."

Proposals should include information about the project's purpose, its link to an abandoned mine land property, cost, specific number of jobs expected to be created, potential partnerships and/or leveraged funds (if applicable), and any

evidence of community improvement and support.

Eligible grant recipients are limited to state and local governments, who may subcontract project-related activities as appropriate.

A committee made up of officials from the Energy and Environment Cabinet, the Cabinet for Economic Development and the Department for Local Government are evaluating all proposals and recommending projects to the federal Office of Surface Mining Reclamation and Enforcement, which is making the final decisions.

The pilot program is part of \$90 million in funds that has been set aside for one-time grants to Kentucky, Pennsylvania and West Virginia to return coal sites to productive uses that will bring new jobs to replace the thousands lost during the downturn of the industry.

You can find the application form and more information about this program by visiting <http://eec.ky.gov/Pages/ALM-Economic-and-Community-Development-Pilot-Program.aspx> or by contacting Bob Scott, Director, KY Division of Abandoned Mine Lands, 300 Sower Blvd, Frankfort, KY 40601. He may also be reached by phone at 502-564-2141 or by e-mail at BobF.Scott@ky.gov.



TOP: Spewing Camp in McDowell, KY before. BELOW: Spewing Camp after reclamations. Photos courtesy of the Department for Natural Resources.

Nurturing nature back to life

Continued from Page 5

white-tailed deer. He also planted soybeans, winter wheat and clover for turkeys, corn for deer and sunflowers to encourage birds. He has planted 20 apple, six pear and five persimmon trees for wildlife also.

Michaels has also eradicated fescue, which provides a very poor habitat for wildlife and restored the area with native warm season grasses. Native warm season grasses (prairie cordgrass, big & little bluestem, Indiangrass, side-oats grama) are bunch grasses, growing in clumps that provide excellent year-round cover for small game. The native grasses increased his small game sightings and has added good nesting sites for birds of all species.

Michaels utilized several federal 'Farm Bill' programs administered by the U.S. Department of Agriculture's Natural Resources Conservation Service to help defer some of his costs. The Forest Land Enhancement Program provides landowners with cost-share dollars to implement their management plans and follow-up technical assistance to encourage management plan completion and the achievement of long-term forest management objectives. The Wildlife Habitat Incentives Program's primary purpose is to address wildlife habitat needs such as the development and maintenance of grassland and early successional forested habitat. The Environmental Quality Incentives Program provides financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation or improved or created wildlife habitat.

Today, Michaels is a certified Tree Farmer and a member of the Kentucky Woodland Owners Association. He is retired and able to spend more time in his woods. He has attended several Kentucky Woodland Owners Short Courses put on by KDF and the UK Department of Forestry. "There are a lot of great, free programs out there for landowners," said Michaels. "I encourage others to use them!"

With all of his hard work, Michaels is happy to report, "And the turkeys have come back. I enjoy the fact that I now see deer, turkey, song birds and doves on a regular basis. I have even sighted the occasional bobcat."

For more information about the Kentucky Forestry Program, check out the web page at <http://forestry.ky.gov/LandownerServices/Pages/default.aspx>.



ABOVE: From left to right, Mrs. Michaels, Michaels and Forester Connie Woodcock. **RIGHT:** The entryway of Michaels's land. Photos courtesy of the Kentucky Division of Forestry.



School energy managers

Continued from Page 3

to more than \$80 million by July of 2016. With the help of these energy managers, school officials are now evaluating every detail of their daily operations, like room temperatures, lighting and making decisions to replace energy-draining equipment with more energy efficient models.

Garry Morgan, Leslie County Energy Manager, worked together with Superintendent Anthony Little and identified various energy projects that could immediately impact the bottom-line. "Even small adjustments can pay-off almost immediately," said Morgan. "Utilizing the utility rebate funding by our utility provider, Kentucky Power, we received a rebate of \$5,500 to replace an assortment of metal halide lights with 102 energy-efficient LEDs and saved \$5,000 annually, with a net cost to the district of \$5,500. Implementing an energy project with about a one-year payback is significant and two additional energy projects have been identified to implement over the next six months with a similar payback."

Energy management basics are the same for all districts and include appointing an energy committee, assessing facilities, developing and implementing an energy management plan and then reporting the status of those efforts annually. Each school district has different needs and priorities. While some realize energy efficiencies by installing efficient lighting or heating, ventilation and air-conditioning (HVAC) systems, others focus on behavior change, creating a culture of energy conservation that involves the entire school campus. Topping the how-to list for effective energy management is having leadership buy-in.

"It is important to understand that learning how to manage our energy resources does not happen overnight," said Jimmy Arnold, Energy Manager and Chief Information Officer for Butler County Schools. "It takes perseverance. Leadership buy-in is very important. Throughout my tenure with Butler County, I've worked with two school superintendents. The support for energy management started in 2004 under then Superintendent Larry Woods, and has continued today with Superintendent Scott Howard. By having their support, and that of the local board, energy management is a priority now throughout the district."

Board of education decisions made regarding facility renovations have allowed Arnold to make the most of the continued focus on energy. Since energy reporting began in 2010, the district has been one of the most energy efficient districts in the state, but they continue to strive to find ways to reduce energy and save thousands of dollars annually.

School Energy Manager Terry Salyer agrees with the importance of leadership buy-in. "Trust is like an invisible resource, and gaining that trust or faith is central to any successful endeavor."

Salyer started as an energy manager six years ago through SEMP and provided services to multiple districts including lead district Johnson County, Lawrence County and Paintsville Independent. Two years later, Martin and Magoffin counties joined the

partnership.

"My first goal was to gain trust in my skills and support for my ideas. I started with utility bill analysis to help my district leaders understand the value of energy management. As a result, we identified significant savings which had a big impact on their largest line item, personnel."

Providing services to multiple districts presents additional challenges to not only managing energy, but managing time as well. As energy manager to a seven-district partnership, Terry Anderson has a unique mix of insight, skills and understanding that places him in the right place at the right time. Anderson provides services to lead school district Fleming County, and partnering districts Bath, Mason, Menifee, Robertson, Rowan and Augusta Independent.

"I have to be flexible," said Anderson. "In one district, the school board may choose an energy savings performance contract, which is a funding mechanism for energy upgrades. It uses the savings from the various energy conservation measures to fund the project, without additional costs to the school district. And in other districts it might be lighting projects or optimizing heating, ventilation, air conditioning controls or developing shutdown procedures for breaks to help the district make daily decisions to reduce energy use."

The KSBA-SEMP program has funded and trained local school energy managers since 2010. This funding currently is in partnership with Louisville Gas & Electric/Kentucky Utilities Company and Kentucky Power Company. By implementing energy efficiency measures, these managers have contributed to 84 percent of districts reducing energy use, with a cumulative savings over \$80 million.

"Kentucky schools have made significant progress in the past six years in eliminating wasteful spending on energy, as boards, staff and students have focused on implementing best energy efficiency practices," said KSBA-SEMP Director Ron Willhite. "Whether it's earning ENERGY STAR certification, implementing energy efficient projects or organizing a student energy team, Kentucky's schools are showing responsible energy and fiscal management practices."



ABOVE: *The Alvaton Cafe at Alvaton Elementary shows numerous sources of natural light that reduce energy costs. Photo courtesy of DEDI.*

Celebrating forty years of biodiversity protection

By Joyce Bender
Kentucky State Nature Preserves Commission



The Kentucky State Nature Preserves Commission is celebrating its 40th anniversary this summer. They have been busy commemorating the occasion with guided hikes and lectures throughout the year to date.

In July of 1976, the statutes that arose from Senate Bill 155 went into effect and mandated the commission to, “secure for the people of present and future generations the benefits of an enduring resource of natural areas by establishing a system of nature preserves, protecting these areas and gathering and disseminating information regarding them, establishing and maintaining a registry of natural areas, and otherwise encouraging and assisting in the preservation of natural areas and features.” Commission staff past and present have diligently done their jobs with this as the agency’s marching orders.

With four executive directors since 1976, leading an organization with such an all-encompassing mission can be extremely daunting. Donald F. Harker, Jr. served as the first director, beginning in 1977. With an incredible vision to build capacity, he used several substantial grants to hire a number of field biologists to initiate inventories of the state. These surveys enabled the commission to lay the groundwork from which sprouted the nature preserve system and a rare species database.

Richard Hannan led the commission from 1982 until 1992. His tenure brought the first appropriation of funds from the General Assembly to purchase nature preserves. Prior to 1990, they had dedicated state park properties, cobbled together funds from various sources and matched Land and Water Conservation Fund

grants with land donations to reach a total of 18 preserves.

Robert McCance was the third director, serving from 1993 until 1997. The Rare Plant Recognition Act was passed during his term and during that year the agency closed on the first tract at Blanton Forest State Nature Preserve, the state’s largest old growth forest. The nature license plate became available for purchase in 1995, providing the commission’s first regular funding for the acquisition of natural areas through the Kentucky Heritage Land Conservation Fund. These nature license plates can still be purchased today at county clerk’s offices across Kentucky to help continue land preservation.

Donald S. Dott, Jr. became the fourth director in 1998 and after eighteen years, has the distinction of being the longest-serving director to date. In 1998, the commission moved ahead with new technology by acquiring Geographic Information System capability. By 2001, the commission could finally say there were preserves from one end of the state to the other. In 2015, he successfully spearheaded efforts to get their highly regarded book, *Kentucky's Natural Heritage: An Illustrated Guide to Biodiversity* (published in 2010) into every middle and high school, including Kentucky’s colleges and universities statewide.

“With 63 State Nature Preserves and an estimated 20,000 visitors annually, the commission is no longer the best kept secret in state government with visitors coming from across the country and even from foreign countries,” said Donald S. Dott. “Kentucky’s committed staff of biologists continue to search the state for the rarest of the rare and the finest examples of Kentucky’s natural landscape. Surprisingly to many folks, new species are still being discovered in Kentucky, and we plan to keep on work-



The commission works to teach children the mysteries of the great outdoors and to enjoy the untouched beauty of each of their Nature Preserves.

ing hard and discovering new things as we can.”

Some notable items that illustrate the breadth of their work include protecting 63 state nature preserves and natural areas totaling over 28,000 acres and tracking 12,684 records of rare species and natural communities in the Natural Heritage Program database. Biologists continue to conduct rare species and natural community inventories, and the agency supports research that has resulted in finding species new to science and a few species that have not been seen for decades. The commission’s work has led to the federal listing of two plant species, one in 2013, the other in 2014, and the delisting of one in 2016. Many of these projects are the results of collaborations with state, federal and private conservation organizations, colleges and universities with whom they share common goals.

Looking ahead, land alterations and invasion of non-native species will continue to take their toll on natural areas and rare species habitat. The impacts from global climate change are hard to assess and plan for. The commission is working with partners to consider appropriate responses to the potential changes coming to Kentucky. They are trying to predict where best to designate protected corridors for species movement as conditions change and animal and plant populations shift in response. They have taken on the study of hymenoptera (bees) and joined forces to aid the monarch butterfly as they assess the plight of pollinator decline. Outreach to the public always remains an important part of their mission. The need to ensure that all Kentuckians are aware of the great benefits derived from maintaining high quality natural areas across the Commonwealth is still a message that rings true and bright to each agency worker.



TOP LEFT: *A child is shown a creature from a stream.* **TOP RIGHT:** *A controlled burn works to clear out unwanted brush and encourage new growth.* **BOTTOM LEFT:** *Workers enjoy a canoe ride on an outing.* **BOTTOM RIGHT:** *Hikers reach the top at Bad Branch high rocks* Photos courtesy of KSNP.

Corporate's changing face

By Kenya Stump
Renewable Energy

It used to be that a shampoo bottle would have printed on it a straightforward pitch for soft, clean, manageable hair.

Now, even the shampoo bottle has become a manifesto to the changing values about community, environment, and the economy. "...because like you we care for earth and hair," the bottle reads. "USDA certified organic, 90 percent post-consumer recycled bottle and 100 percent certified wind power, vegan and no animal testing."

And the shampoo bottle is not alone. This is just one example of how corporate social responsibility is changing and how an increasing number of Kentucky companies are making decisions, developing public policy and impacting the lives of their employees and the communities in which they operate. Society has moved beyond just expecting corporations to comply with regulations to something even bigger corporate ethics and culture. Corporations are adapting to this cultural shift, and if we want to know what the future holds we need to take a deeper look inside Kentucky's corporate citizens.

One example of this in Kentucky is how L'Oreal in northern Kentucky, a 2016 World's Most Ethical Company, has embraced this cultural shift. "Over the last 10 years, we have seen growing expectation for companies to behave ethically," said Jean-Paul Argon, Chairman and CEO of L'Oreal. "The next 10 years will see ethics becoming no longer a 'nice to have' but a fundamental prerequisite to any organization's license to operate."

Corporate social responsibility is now in a place where quality, safety and compliance were 20 years ago. It's not enough to have just a person or even a sustainability department; it's instilling those values in every employee, supplier and making sure the product reflects those values. Looking at the 2015 Fortune 50 U.S. largest corporations with facilities in Kentucky, most have identified corporate social responsibility goals. The same can be said for the Fortune 500 U.S. corporations headquartered in Kentucky: Humana, YUM! Brands, Ashland, General Cable and Kindred Healthcare.

Social responsibility standards are also evolving to meet the needs of these corporations.

One way this can be seen is in United Parcel Service's 2014 Corporate Sustainability Report, which utilizes the Global Reporting Initiative's framework. This reporting standard helps organizations communicate the impact of business on sustainability issues and allows citizens access to business sustainability information in a standardized way to aid better decision making.

FORTUNE 50 Largest U.S. Corporations *with Facilities in Kentucky*

Wal-mart Stores Inc.
Chevron
Berkshire Hathaway
Phillips 66
General Motors
Ford Motor
General Electric Company
AT&T
Hewlett Packard
AmerisourceBergen
The Kroger Company
J.P. Morgan Chase & Co.
International Business Machines (IBM)
Marathon Petroleum Company LP
Cardinal Health
Citigroup
Amazon.com
Archer Daniels Midland
Johnson & Johnson
Anthem
PepsiCo
American International Group (AIG)
United Parcel Service (UPS)
Dow Chemical

Other common frameworks include the Carbon Disclosure Project (CDP) and the International Standard Organization (ISO) 26000 standard, each with different missions. The CDP represents a type of "tell all and be judged" program that relies on the market to force changes through measurement and disclosure of environmental information. ISO 26000, on the other hand, is "old school," comes with a solid reputation and a long history of management systems certifications. While the ISO 26000 standard cannot be certified today and are guidelines, it's not hard to imagine the evolution of 26000 to full certification of social responsibility.

Some companies, who may not want standards or formalized frameworks, find it easier to join with others through a global organization like the United Nations Global Compact (UNGC).

Continued on Page 19

Kentucky to be represented in the North American Envirothon Competition



ABOVE: From left to right, competition sponsors Dorothy Anglin of Smithfield Foods and Jeremy Roy of Farm Bureau pose with George Simpson, Theo Livas, Jinny Han, Jasmine Liu and Lucy Yang. Photo courtesy of the Kentucky Division of Conservation.

By Johnna McHugh
Division of Conservation

A team from Paul Laurence Dunbar High School in Lexington won at the Kentucky Envirothon competition May 18-19 and are moving on to represent Kentucky at the North American Envirothon competition at Trent University in Peterborough, Canada, on July 24-29.

And winning for this team is nothing new. This is the second year that the team has won the competition. These five seniors, George Simpson, Jasmine Liu, Jinny Han, Lucy Yang and Theo Livas, have been competing together in the Envirothon competition since they were freshman. In addition to having the highest overall score at the Kentucky Envirothon this year, this team was also recognized for having the highest score in the oral presentation competition, as well as the highest scores on the soils and forestry tests.

As state winners last year, these five students made the Commonwealth proud as they ranked 12th out of the 52 teams competing at the North American Envirothon. Team coach Carly Burton said, "I'm so proud of these kids. They set a goal for themselves to win state their junior and senior years, and they really put in the work to make sure that happened. I'm excited to see what they are able to do in Ontario!"

North Laurel High School was the highest-scoring team affiliated with a local FFA chapter. Their team will represent Kentucky at the Environmental and Natural Resources Career Development Event, which will take place in conjunction with the National FFA Convention in Indianapolis, Indiana, in October.

One of the teams from Madison Southern High School scored the highest on the invasive species test. The aquatics and wildlife tests were won by the team from the Gatton Academy.

Kimberly Richardson, director of the Kentucky Division of Conservation, said, "The Envirothon competition gives these students a chance to learn more about our natural resources in practical and hands-on ways. As future leaders, it's important that they understand our environment and how environmental systems work together."

It is also important that kids and schools get involved. More information on the competition and how to enter can be found at <http://conservation.ky.gov/Pages/Envirothon.aspx>.

The Kentucky Envirothon competition is sponsored by Kentucky Association of Conservation Districts, Kentucky Corn Growers Association, Kentucky Small Grain Council, Kentucky Farm Bureau, Kentucky Department of Agriculture, Smithfield Foods, Kentucky Association of Conservation District employees and Kentucky Association of Conservation Districts Auxiliary. 

A Wetlands beckons



By Zeb Weese

Kentucky Department for Natural Resources

If John James Audubon walked around the state park named after him, he'd be right at home among the nesting bald eagles and the great blue heron rookery.

So, it only makes sense that the Audubon Wetlands for Kentucky State Parks, named in his honor, is a place to protect the wetland flora and fauna and provide the public, including visitors with disabilities, an exceptional opportunity to experience nature.

The 650-acre tract was purchased in April, thanks to a grant by the Kentucky Heritage Land Conservation Fund (KHLCF), the Imperiled Bat Conservation Fund of the U.S. Fish and Wildlife Service and a group of Henderson County citizens.

"The purchase of the Audubon Wetlands for Kentucky State Parks is a great example of the KHLCF at its finest," said KHLCF Chairman Dr. Richard K. Kessler. "This site will protect significant biological features and is expected to become one of the "hotspots" for birding and nature tourism in the region."

One of the most interesting features of the park is its extensive handicapped accessible boardwalks that snake through the wetlands, that are not available at many other state conservatories.

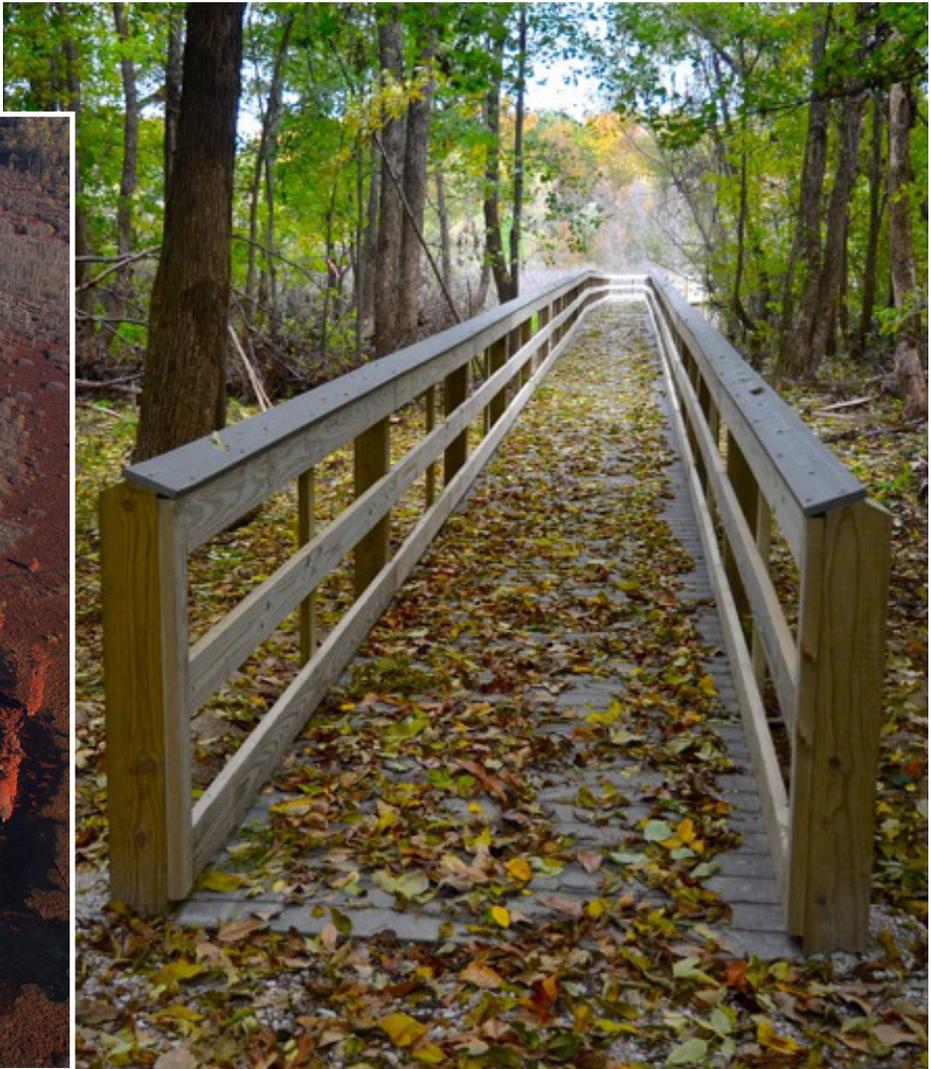
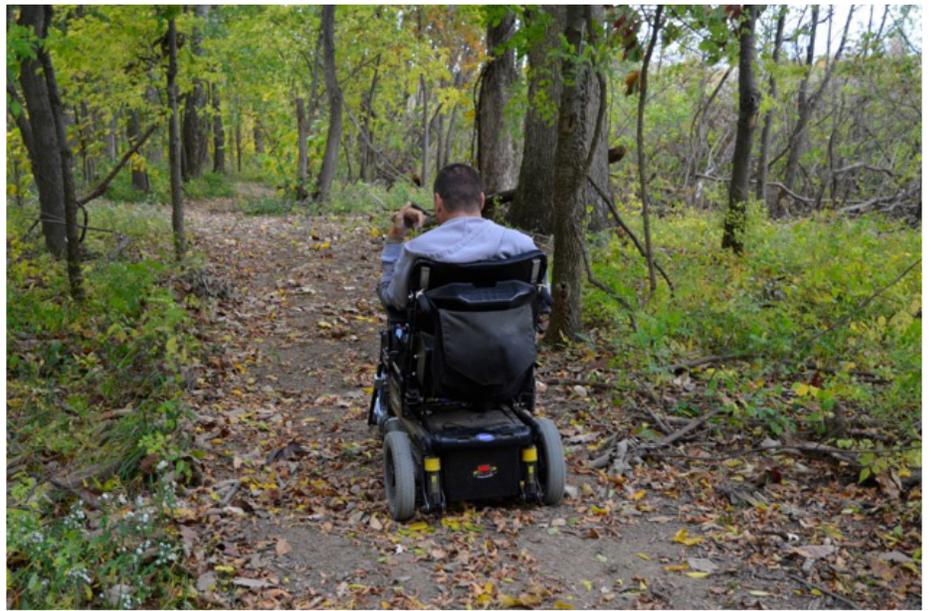
Robbie Williams of the Friends of Audubon stated, "We have already constructed a 750-foot wheelchair accessible boardwalk across the swamp. One of our partners, Will Esche, is quadriplegic and has single handedly educated us about the need for accessible outdoors for everyone. In fact, Will guided a trail clearing crew through heavy brush, all done with a GPS from his wheelchair in a custom off-road cart."

The new property was formally dedicated on May 16, 2016. Roads, parking and signage are expected to be completed by the end of the year. More than six miles of trails are planned, as well as tree plantings and multiple wildlife habitat improvement projects.

“The Kentucky State Parks are grateful to all of the people and agencies who assisted with making this project work,” said Parks Commissioner Donnie Holland. “Park guests and future generations will be able to learn about wildlife and the natural beauty of Kentucky thanks to this innovative addition at John James Audubon State Park.”

The recently procured 650 acres is part of the nearly 90,000 acres in 68 counties for nature tourism and natural resource enhancement the KHLCF has now protected.

For more information, visit the KHLCF website at <http://heritageland.ky.gov> or contact Zeb Weese at zeb.weese@ky.gov.



OPPOSITE PAGE TOP: A walkway that is handicap accessible welcomes visitors. **OPPOSITE PAGE BOTTOM:** A bald eagle and eaglet sit in their nest in the Wetlands. **TOP:** Will Esche leads the way in his GPS enabled wheelchair. **BOTTOM LEFT:** An aerial view of the Wetlands is shown. **BOTTOM RIGHT:** A ramp welcomes all visitors to explore and see the beauty of the Audubon Wetlands. Photos courtesy of KDNR.

Lessons on lead-

keeping Kentucky's water safe

By Lanny Brannock
Department for Environmental
Protection

Three public employees in Flint, Michigan are facing criminal charges in what's becoming one of the largest public utility scandals in the country's history.

The story of Flint, Michigan, where residents and children got lead poisoning from simply turning on their taps, is a scandal that was avoidable and has regulators in state and local governments charged with providing drinking water across the country saying, "It could have been me, and I'm glad it wasn't."

And it began with a change that would seem, to someone who didn't know the chemistry and complexities needed to turn raw water from a river into water safe for consumption, very simple.

Water is just water, after all?
Not quite.

In 2014, the city of Flint, Michigan, temporarily switched its water source from Lake Huron to the Flint River, an inland source that can cause greater challenges for treating water than water that is from the Great Lakes. Flint treated the river water, but the water reaching people's homes was corrosive, allowing it to absorb an unacceptable level of lead from the lead service lines that connect water mains to household plumbing.

It was a catastrophic error, one which has poisoned residents who drank the water, including children, who are the ones most susceptible to lead and its side effects.

Those side effects are compounded by the fact that the damage, which includes mental and physical problems such as learning disabilities, developmental delay, weight loss, hearing loss, kidney damage and brain damage, can be permanent or in some cases fatal. State water officials in Kentucky know that what happened in Flint isn't the norm, but isn't that far-fetched either.

"We have always paid attention to lead in drinking water, but when the news broke about Flint, it was a huge reminder that we have to be very mindful about water source changes and any other potential issue that could cause lead issues," said Peter Goodmann, Division of Water Director. "Our number one priority is public health."

Goodmann knows all too well, yes, it could happen in Kentucky. Despite only a handful of lead levels exceeding federal standards in the last decade in Kentucky, Goodmann and Department for Environmental Protection Commissioner Bruce Scott wanted to look deeper into the issue of lead in drinking water.

They've asked water quality professionals with decades of experience from all across the state to participate in Kentucky's Lead in Drinking Water Workgroup. The group has been meeting with a goal of trying to ensure that Kentucky's water systems provide the best possible potable water and keep lead from getting into the drinking water supply.



Photo by Lanny Brannock

Lead and Its Dangers

“Through testing, we know when we get an elevated lead sample; source water is almost never the issue. It’s why property owners need to be vigilant if they still have lead service lines, either from the public water system they get water from or inside their property,” Goodmann said.

The vigilance might mean replacing lead lines with PVC pipe or having your water tested regularly.

Public water systems in Kentucky have also been monitoring water within households since the implementation of the federal Lead and Copper Rule in the early 1990s. Lead levels are sampled regularly by public water systems at residences and businesses to ensure drinking water is safe. The results of these samples are reported to the residents and businesses sampled, as well as water system customers. Sample results are also provided to the Division of Water and the United States Environmental Protection Agency for review and action, as appropriate.

The Lead and Copper Rule requires water systems to sample a number of households in their distribution system, based on population. The sampling focuses monitoring on those households most vulnerable to lead and copper contamination, such as single-family homes that contain copper pipes with lead solder, contain lead pipes or are served by a lead service line.

Sampling is conducted over two consecutive six-month periods. If no elevated levels are found, sampling is reduced to annual sampling for two consecutive years, and then every three years if no issues are identified.

The Lead and Copper Rule established that a public water system’s monitoring results must be at or below the lead action level to avoid further monitoring, treatment and other actions. The action level is exceeded when more than 10 percent of the water system’s samples exceed the 15 parts per billion threshold. Exceedance of an action level determines whether systems need to undertake additional monitoring and treatment technique requirements.

But the important news for Kentuckians is, the vast majority of samples show we are meeting standards.

Over the past four years, the 409 Kentucky public water systems subject to the Lead and Copper Rule have collected, tested and reported approximately 10,380 water samples for lead at households and businesses. More than 77 percent of these samples had no detection of lead, while approximately one percent of these samples exceeded the action level of 15 parts per billion established by the EPA in the Lead and Copper Rule.

Based on the reported data discussed above, 76 public water systems had a cumulative total of 107 samples over the four year period where lead was detected at a concentration equal to or greater than 0.015 mg/l. The vast majority of these detections were not at a frequency that required additional action under the federal Lead and Copper Rule. However, three of these public water supplies did exceed the federally established action level for lead.

“We know these numbers indicate a high level of competency among our public water systems when it comes to lead,” Goodmann said. “But having the vast majority of systems that meet lead standards is only part of providing high quality, safe drinking water. We have to look forward to make sure that we continue to have the vast majority of systems that meet lead water quality standards.” As a result, under Division of Water oversight, these systems were required to notify the public via newspaper and other media, conduct sampling of their source water, conduct additional and broader water quality monitoring at the treatment plant and in the distribution system, including restarting lead monitoring, and to formulate a plan and take action to reduce lead levels. All of these public water systems have returned to compliance. Currently there are not any Kentucky facilities out of compliance with the federal standard for lead.



ABOVE: *An inside look at a water treatment facility.* Photo courtesy of LAW files.

Continued on Page 19

The 2016 Earth Day Celebration



On April 21, 2016, the Energy and Environment Cabinet, the Kentucky Division for Air Quality and the Environmental Quality Commission (EQC), along with the Kentucky Environmental Education Council (KEEC) celebrated Earth Day with environmental awards to individuals and schools, and displays to show how everyone can be good to our home- the earth.

The event took place at the Thomas D. Clark Center for Kentucky History in Frankfort.

The EQC presented its annual Earth Day awards to individuals who have made significant contributions to environmental protection. Also, KEEC honored several nominees for the Kentucky Green Ribbon Schools program and awardees for the Green and Healthy Schools program for their accomplishments in energy conservation and announced the winner of the annual 'Capture the Earth' photography contest.





Various booths, activities, important visitors and the Tesla are shown. All were displayed in an effort to raise environmental awareness and connect with the community. Photos by Carrie Searcy and John Mura.

Lessons on lead-

Continued from Page 16

Public Water Supply System Source Water

In Flint, Michigan, changing water sources created a situation where lead became a significant concern. In Kentucky, if a water system intends to use another source of water, even a new well, the Division of Water engineers review the plans for treating the water and examine corrosion-control methods that could be necessary to ensure that the water does not leach metals, such as lead and copper from pipes, within the distribution system.

To avoid unintended consequences from source or treatment changes, any such changes by a water system require a Division of Water review and approval before they take effect. Pilot studies may be required as part of the review and approval. A new source of water and/or treatment change also brings about changes in the monitoring frequency required for the system for examining lead levels in the water.

The Division of Water technical personnel also review water quality reports, which follow each round of sampling by a system. Based on these reports, the Division of Water may issue recommendations to address any possibility that the water has the potential to leach materials, including lead, from service lines and household plumbing.

Even though Kentucky drinking water systems have been very successful in avoiding significant lead concerns, there is always room for improvement. The Division of Water will continue to work with drinking water industry stakeholders and other state agencies to review lead related protocols to ensure changes in source water and treatment processes are appropriate and sufficient to avoid unintended consequences from source or treatment changes.

In addition, the Division of Water will be discussing with the Environmental Protection Agency the need to evaluate the Lead and Copper Rule to ensure that the rule's provisions and requirements are adequate to protect public health. While the existing rule has provided a good framework for identifying and responding to lead concerns, the events leading to the problems in Flint have shown that there is reason to evaluate the rule and make public safety an utmost priority. ■

Corporate's changing face

Continued from Page 11

The UNGC is simply a voluntary call to action for companies "to align strategies and operations with universal principles on human rights, labor, environment and anti-corruption." In Kentucky, General Electric (GE), Ford, Lexmark and PepsiCo all have signed onto the Global Compact and voluntarily pledged to create a culture of integrity across their organizations.

Knowing where these corporations are headed is essential to ensuring that Kentucky is ready to meet their needs.

At GE, they take climate policy head on. In February 2014, GE announced a new goal for greenhouse gas reductions through 2020. This new goal is set at a 20 percent reduction from a 2011 baseline of operational greenhouse gas emissions. GE's Climate Policy states, "The scientific consensus is that fossil fuels used to generate electricity generation [sic] and power transportation emit amounts of carbon dioxide that are changing our climate. GE supports carbon policies that aspire to reduce emissions and encourage businesses to do what they do best, innovate and compete to create and disseminate new technologies and solutions at the lowest net cost."

Climate change is just one concern as companies focus on what aligns with their values and culture, like water conservation at Brown-Forman. According to their 2015-2016 Corporate

Responsibility Report, "Clean and readily available water is a vital ingredient of our products, so we have always had a strong interest in protecting water quality and availability."

Putting words to action, Woodford Reserve Distillery has partnered with The Nature Conservancy and launched a multi-year restoration project replanting the area alongside Glenn's Creek and local pond with native vegetation such as white pond lilies that will help improve the water quality and control algal blooms.

And it's not just our manufactures focusing on bettering the environment. Khol's 14 retail stores in Kentucky are either LEED-certified or Energy Star-certified. According to Khol's, "From large-scale initiatives, like constructing environmentally friendly buildings, to everyday practices, like recycling hangers, we're taking big steps to ensure we leave a smaller footprint." Spanning 49 states, Khol's has 163 locations with solar power, 1,009 Energy Star certified stores along with 466 LEED buildings and 186 electric charging stations.

Outside of certifications, standards, or reports, consumers increasingly want to buy products that perform and are socially responsible. Businesses, likewise, want to meet changing customer demands and shareholder values. ■

EcoART contest winners announced

By Mary Jo Harrod
Division of Compliance Assistance

For 2015-2016, students submitted artwork in a variety of media for the Kentucky Department for Environmental Protection (DEP) EcoART contest. This contest is aimed at encouraging Kentucky high school students to express themselves through artwork that inspires others to protect and preserve the environment. Creative, interesting, colorful and thought-provoking works are the result.

Such works include drawing/painting/print work, mixed media, sculpture/pottery, digital artwork and photography. Visited by hundreds of visitors annually, the hallways at the DEP Training Center in Frankfort are decorated with the student artwork that is based on the themes of water, air, land and natural habitat.

"I found a mushroom on the ground and thought it was cool because of the unusual color. Unusual items in the environment, such as this, are the simple beauties that everyday people skim past and look over," said Jessie Grissom, a student winner from Metcalfe County High School, who photographed a colorful mushroom for the theme of Land and Natural Habitats. "It relates to land and natural habitat because a mushroom is a naturally occurring beauty that needs to be preserved."

Shelby Cook, from Pleasure Ridge Park High School in Louisville, used wire and string to sculpt the body of a fox, for the theme of Land and Natural Habitats. Yarn was used to create a fluffy tail.

"I was inspired by a video I saw of little foxes caught on camera in the middle of the night," said Cook. "They were acting just like little puppies. It amazed me that these little wild creatures play just like our cats and dogs. To me, foxes represent innocence, but are wild creatures. I believe that it's important for us to protect the environment of these very special, playful animals. In order to preserve this wild playground and its creatures, we have to intentionally take steps to ensure that their habitats are protected and maintained."

Other winning entries were submitted by Sandra England, Katelyn Reagan and Maggie O'Leary from Metcalfe County High School in Edmonton; and Sophie Cozzolino from North Bullitt High School in Shepherdsville.

Details about the upcoming 2016-17 Eco-Art Contest will be announced later this year. For more information about the contest and how to enter, visit <http://dca.ky.gov/LGGS/Pages/ecoart.aspx>.



Jessie Grissom



Shelby Cook



Sandra England



Sophie Cozzolino



Katelyn Reagan



Maggie O'Leary



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Seedling nurseries: growing trees for healthy and productive forests



Alders are beautiful and functional plants. They are fast growing and can easily be trained to a tree-like form by removing lower branches. Rapid growth in open habitats, wide tolerance to soil types, and potential for soil conditioning make tag alder useful in rehabilitation of disturbed sites, including old mines.

Just the Facts: tag alder or speckled alder (*Alnus incana*).

Growth: Tag alder grows mostly as a shrub but can grow as a small tree if the lower branches are trimmed off as it is growing. The bark is gray, reddish, or brown, thin and smooth. Leaves are elliptic to ovate, 4-11 cm long, 3-8 cm wide, doubly and irregularly toothed, dull dark green above. Male and female flowers are in catkins, borne separately, but on the same tree. The seed catkins are cone-like, generally remaining intact after release of fruits in spring.

Range: The range of tag alder in North America reaches into the Lake States and Northeast and as far south (at higher elevations) as Iowa, West Virginia, Maryland, and Virginia.

Wildlife Uses: Tag alder thickets provide cover for moose, white-tailed deer, rabbits, and others. Moose, muskrats, beavers, and rabbits browse the twigs and foliage. Songbirds, including redpolls, goldfinches, woodcock, and grouse eat the seeds, buds, and catkins. Beavers build dams and lodges with tag alder.

Tree Trivia: Tag alder's acceptance of a wide variety of soil types makes it a good choice for disturbed site rehabilitation. This is a valuable species to plant along stream banks for erosion control.

Chippewa Indians mixed alder root scraping with grounded up bumblebee and fed the mixture to women whom were having difficulty during childbirth.

Seedlings are available from early fall to early spring from the Division of Forestry's nurseries. Orders are shipped at your request for planting projects during the dormant period throughout the winter. To obtain an order form, visit <http://forestry.ky.gov/statenurseriesandtreeseedlings/Pages/default.aspx> or call the Division of Forestry at 1-800-866-0555. 